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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/691,583	10/18/2000	Neil Maxwell McLachlan	00-704-US	5062

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EXAMINER

REIS, TRAVIS M

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 08/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/691,583

Applicant(s)

MCLACHLAN ET AL.

Examiner

Travis M Reis

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 5/31/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 15-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claims 12 & 20 are objected to because of the following informalities:
  - a. Claim 12 recites the limitation "the side portion" in line 1. There is insufficient antecedent basis for this limitation in the claim.
  - b. Claim 20 recites the limitation "an initial bell shape," which lacks proper antecedent basis since this limitation has already been stated in Claim 15.Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 1-13, 15-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
  - a. The limitation "a first at least three frequencies" in claims 1 & 15 is unclear. The language of the claims is rendered indefinite due to the ambiguity whether "a first at least three frequencies" is part of the "plurality of modal frequencies" mentioned beforehand in the claims. Examiner suggests the following correction to overcome this rejection:

"A bell having a plurality of modal frequencies, *wherein the first three of said frequencies, at minimum, are* substantially in an harmonic sequence..."

- b. Claim 2 states "said first at least three frequencies," which is indefinite for reasons disclosed above, and can be overcome in similar fashion.
  - c. Claim 13 states "a first at least four frequencies," which is indefinite for reasons disclosed above, and can be overcome in similar fashion.
  - d. The term "substantially" in claims 1, 13, & 15 is a relative term which renders the claims indefinite. The term "substantially" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.
  - e. Claims 3-12 & 16-21 are rejected due to their dependence on rejected base claims.
4. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: In claim 1, the structure that allows a bell to have a plurality of modal frequencies, wherein any number of frequencies are substantially in a harmonic sequence.

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-13, 15-21 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. As cited by Applicant, the Collins

Encyclopedia of Music, pages 20-21, and the Lehr paper, page 20, "an harmonic bell..." having frequencies in the ratios 1,2,3,...N, "...is an impossibility." An invention that cannot exist is inoperative and lacks utility. Applicant is invited to demonstrate the existence and utility of the invention.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1-13 are rejected under 35 U.S.C. 102(a) as being anticipated by Fountain et al. (hereafter Fountain) in the document "Tuning of Bells by Numerical Methods of Shape Optimism".

With reference to claims 1-3, Fountain teaches a bell having the first at least three frequencies substantially in an harmonic sequence wherein, of the tuned frequencies, the frequencies due to modes with no ring nodes are all below any frequencies due to modes with ring nodes (Table 1) (p. 3, para. 6, lines 2-3). The claim language stated in Claim 1 does not rule out the odd harmonic sequence, since it is still, in a broad sense, substantially in a harmonic sequence.

With reference to claims 4-7 & 10-12, Fountain teaches the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion being generally in the form of a truncated circular cone and generally convex, the inner surface of the side portion being generally in the

form of a truncated circular cone, and generally concave, the whole bellshape being generally tapered (Figure 6).

With reference to claims 8-9, Fountain teaches the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion substantially consisting of a generally convex portion and a portion generally in the form of a circular cylinder & the inner surface of the side portion substantially consisting of a generally concave portion and a portion generally in the form of a circular cylinder (Figure 3).

With reference to claim 13, Fountain teaches a bell having the first at least four frequencies substantially in a harmonic sequence (p.3, para. 7, line 3).

9. Claims 1-13, 15 & 19-21 are rejected under 35 U.S.C. 102(a) as being anticipated by Schoofs et al. (hereafter Schoofs) in the document "Computation of Bell Profiles Using Structural Optimization".

With reference to claims 1-3, Schoofs teaches a bell having the first three frequencies which are substantially in an harmonic sequence wherein, of the tuned frequencies, the frequencies due to modes with no ring nodes are all below any frequencies due to modes with ring nodes (p. 248-9 para. 2, lines 1-10 para. 1-2, lines 1-21). Since the term "substantially" has not been defined, the Examiner considers the frequencies in the ratio of "1, 2, 2.5" disclosed by Schoofs to be, in a broad sense, substantially in a harmonic sequence.

With reference to claims 4-7 & 10-12, Schoofs teaches the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth,

the outer surface of the side portion being generally in the form of a truncated circular cone and generally convex, the inner surface of the side portion being generally in the form of a truncated circular cone, and generally concave, the whole bellshape being generally tapered (Figure 1).

With reference to claims 8-9, Schoofs teaches the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion substantially consisting of a generally convex portion and a portion generally in the form of a circular cylinder & the inner surface of the side portion substantially consisting of a generally concave portion and a portion generally in the form of a circular cylinder (Figure 1).

With reference to claims 15 &19, Schoofs teaches a method for designing a bell shape for a bell having the first at least three frequencies substantially in an harmonic sequence, the method comprising the steps of selecting an initial bell shape, the initial bell shape is a rescaled existing bell shape, and using the initial bell shape in an optimization procedure for modifying the bell shape such that the first at least three frequencies are substantially in an harmonic sequence (p. 248-9 para. 2, lines 1-10 para. 1-2, lines 1-21).

With reference to claim 20, Schoofs teaches the optimization procedure comprises the steps of: (a) setting the current bell shape to an initial bell shape; (b) selecting one of the at least three frequencies to be tuned as a current objective; (c) selecting a desired value for the current objective to attain or a desired range for the current objective to fall within; (d) modifying the current bell shape in accordance with

an optimization method, the optimization method being to cause the value of the current objective to move towards the desired value or range; (e) repeating step (d) as many times as necessary for the value of the current objective to become substantially equal to the desired value or for the objective to fall within the desired range; (f) if the at least three frequencies to be tuned are not substantially in an harmonic sequence, selecting one of the at least three frequencies to be tuned as the current objective; (g) repeating steps (c) to (e) in relation to the current objective, subject to a suitably chosen constraint or constraints to cause at least one of the frequencies to be tuned to approach or attain a desired value or desired frequency ratio; and (h) repeating steps (f) and (g) until the first at least three frequencies are substantially in an harmonic sequence (p. 252-3, para. 2, lines 1-17, para. 1, lines 1-9).

With reference to claim 21, this is a "product by process" claim since the claim language is directed to the steps required to form the bell. Therefore, these steps have been given no patentable weight since it has been held that 1) the determination of patentability in "product by process" claims is based on the product itself, even though such claims are limited and defined by the process, and 2) the product in a "product by process" claim is unpatentable if it is the same as, or obvious from a product of the prior art, even if the prior art product was made by a different process. In re Thorpe et al., 227 USPQ 964 (Fed. Cir. 1985).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:



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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoofs in view of Fountain.

With reference to claims 16 & 17, Schoofs teaches all of the instant claimed invention as stated above in the rejection of claims 15 & 19-21 but lacks the frequencies being without ring nodes below any frequencies due to modes with ring nodes.

Fountain teaches a bell with such frequencies (p. 3, para. 6, lines 2-3). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention was made to use the frequencies disclosed by Fountain in the method disclosed by Schoofs et al. in order that the bell would be optimized with respect to its shape for producing sound.

With reference to claim 18, Schoofs teaches the initial bell shape has a top portion, a side portion and a mouth, the side portion extending from the top portion to

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the mouth, the initial bell shape being conical, the side portion tapering, concave on the inside, an increased length of the side portion, and decreased thickness of the side portion (Figure 3).

### ***Response to Arguments***

13. Applicant's arguments filed 5/31/02 with respect to claims 1-13 have been fully considered but they are not persuasive, since the language of claim 1 is met by the "odd harmonics" disclosed by Foutain as disclosed in the body of paragraph 8.

14. Applicant's arguments with respect to claims 1-13 & 15-23 have been considered but are moot in view of the new ground(s) of rejection stated in the bodies of paragraphs 9 & 12.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hibberts discloses two articles on Taylor true-harmonic tuning and the sound of bells (<http://www.hibberts.co.uk/history> and <http://www.hibberts.co.uk/intro> ). Westcott discloses a text on bells and their music (<http://www.msu.edu/~carillon/batmbook/cover.htm> ).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Travis M Reis whose telephone number is (703) 305-4771. The examiner can normally be reached on 8:00--5:00 Monday--Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (703) 308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Travis M Reis  
Examiner  
Art Unit 2859

tmr  
August 14, 2002



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800